

What is claimed is:

1. A block data storage device, comprising:  
a data recording medium on which user data are stored in a number of data  
sectors having data sector addresses;  
a moveable data transducing head which accesses the data sectors; and  
an interface circuit which processes read commands from a host device to  
retrieve requested user data from selected data sectors, the interface  
circuit dynamically switching from a nonlocal mode of operation to  
a local mode of operation in relation to proximity of a data sector  
address of a most recently received read command to data sector  
addresses associated with previously received read commands,  
wherein during the local mode of operation, nonrequested user data from  
the recording medium are retrieved and placed into a buffer in  
anticipation of a future request for the nonrequested user data, and  
wherein during the nonlocal mode of operation said nonrequested  
user data are not retrieved.

2. The block data storage device of claim 1, wherein the interface  
circuit generates a read command history table comprising a range of data sector  
addresses associated with each of a plurality of n recently received read  
commands.

3. The block data storage device of claim 2, wherein the interface  
circuit switches from the nonlocal mode to the local mode of operation when a data  
sector address associated with the most recently received read command falls  
within one of the ranges of data sector addresses of the read command history  
table.

4. The block data storage device of claim 1, wherein the interface  
circuit further dynamically switches from the local mode to the nonlocal mode of  
operation in relation to the proximity of the data sector address of the most recently

received read command to the data sector addresses of previously received read commands.

5           5.     The block data storage device of claim 4, wherein the interface circuit generates a read command history table comprising a range of data sector addresses associated with each of a plurality of n recently received read commands, and wherein the interface circuit switches from the local mode to the nonlocal mode of operation when a plurality of m consecutive read commands are received in turn having associated data sector addresses which do not fall within at least a selected one of the ranges of data sector addresses of the read command history table.

10           6.     The block data storage device of claim 1, wherein the block data storage device comprises a disc drive and the recordable medium comprises a rigid magnetic recording disc.

15           7.     The block data storage device of claim 1, wherein the recordable medium comprises a recording disc on which a plurality of concentric tracks are defined, and wherein during the local mode the interface circuit employs a read look ahead (RLA) technique so that, during a latency period between execution of consecutive first and second read commands, the interface circuit causes the data transducing head to remain on a first track having a data sector associated with the first read command so that the nonrequested data are retrieved from at least one other data sector on the first track.

20           8.     The block data storage device of claim 1, wherein the recordable medium comprises a recording disc on which a plurality of concentric tracks are defined, and wherein during the local mode the interface circuit employs a read on arrival (ROA) technique so that, during a latency period between execution of consecutive first and second read commands, the interface circuit causes the data transducing head to move to a second track having a data sector associated with the second read command so that the nonrequested data are retrieved from at least one other data sector on the second track.

9. A block data storage device configured to retrieve user data to a host device in response to read commands issued by the host device, comprising:

a data buffer;

a data recording medium on which the user data are stored in a number of data sectors having associated data sector addresses;

a data transducing head adjacent the data recording medium and which accesses the data sectors; and

means for dynamically switching from a nonlocal mode of operation to a local mode of operation in relation to a detected access pattern in read commands issued by the host, wherein during the local mode of operation nonrequested user data are retrieved from the recording medium and placed into the buffer in anticipation of a future request for the nonrequested user data, and wherein during the nonlocal mode of operation said nonrequested user data are not retrieved from the recording medium and are not placed into the buffer.

10. The block data storage device of claim 9, wherein the means for dynamically switching operates to compare a selected data sector address of a most recently issued read command to data sector addresses associated with a plurality of recently issued read commands.

11. The block data storage device of claim 9, wherein the means for dynamically switching further operates to dynamically switch from the local mode of operation to the nonlocal mode of operation.

12. The block data storage device of claim 9, wherein the means for dynamically switching comprises an interface circuit comprising a programmable controller.

13. A method for transferring data between a host device and a block data storage device having a first memory space and a second memory space, the second memory space storing user data in a plurality of data sectors each having an associated data sector address, the method comprising:

providing a most recent read command to request user data from a selected data sector having a selected data sector address;

comparing the selected data sector address to data sector addresses associated with a plurality of recent read commands; and

switching from a nonlocal mode of operation to a local mode of operation when the selected data sector address overlaps at least one of the data sector addresses associated with the plurality of recent read commands, wherein during the local mode of operation, nonrequested user data are retrieved from the second memory space and placed into the first memory space in anticipation of a future request for the nonrequested user data, and wherein during the nonlocal mode of operation said nonrequested user data are not retrieved from the second memory space and are not placed into the first memory space.

14. The method of claim 13, wherein the comparing step comprises generating a read command history table comprising a range of data sector addresses associated with each of a plurality of  $n$  recently received read commands.

15. The method of claim 14, wherein the switching step comprises switching from the nonlocal mode to the local mode of operation when a data sector address associated with the most recent read command falls within at least a selected one of the ranges of data sector addresses of the read command history table.

16. The method of claim 13, wherein the switching step further comprises switching from the local mode to the nonlocal mode of operation in

relation to the proximity of the data sector address of the most recently received read command to the data sector addresses of previously received read commands.

17. The method of claim 16, wherein the comparing step comprises  
5 generating a read command history table comprising a range of data sector addresses associated with each of a plurality of n recently received read commands, and wherein the interface circuit switches from the local mode to the nonlocal mode of operation when a plurality of m consecutive read commands are received in turn having associated data sector addresses which do not fall within at  
10 least a selected one of the ranges of data sector addresses of the read command history table.

18. The method of claim 13, wherein the block data storage device  
15 comprises a disc drive and the recordable medium comprises a rigid magnetic recording disc.